

Urban Waters Initiative

Bronx and Harlem Rivers

U.S. Geological Survey

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In cooperation with:



National Park Service



New York City
Environmental Protection

USGS Water Science Centers

- Surface water
- Groundwater
- Water Quality
- Real-time and historical data available online
- Mapper to search by location
- Basic Data
 - Nationwide network of GW water levels, stream flows, SW and tidal info
 - Critical for water-resource management
- Hydrologic Studies
 - Project oriented
 - Unbiased, high-quality data from National laboratories

Urban Waters Initiative

Bronx and Harlem Rivers



- Urban Waters Initiative (UWI) mission
 - Revitalize watershed
 - Improve water quality
 - Connect community with their natural resource
- Local, State, and Federal partnership
 - Community groups; NYC EP
 - NYS DOH, DOT
 - EPA; NPS; NOAA; Army Corp. of Eng.; USGS
- USGS Role
 - Take lead in scientific assessment
 - Provide interpretation to inform decisions
 - Engage community through outreach

Urban Waters Initiative

Bronx and Harlem Rivers

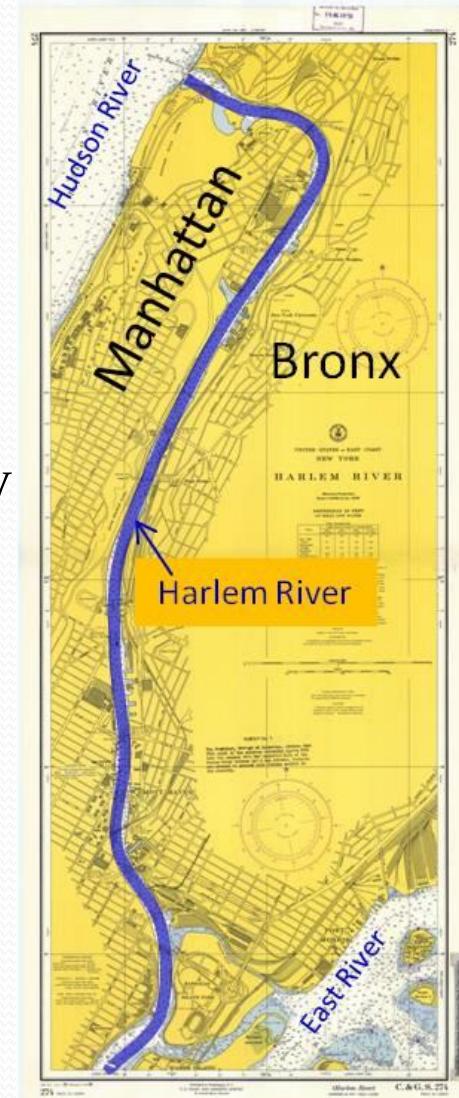
USGS Regional Executive Flexible Spending Grant to support the UWI

- Compile and review existing water-quality and hydrologic data on the Harlem River
- Identify gaps in data and offer suggestions for additional water-quality monitoring as needed
- Identify water-quality problems and likely sources
- Prepare fact-sheet summarizing water-quality data of the Harlem River
- Present findings to residents and partners through coordination with local community groups
- Tabulate compiled data into GIS format for use in mapper programs developed by NYC and the GAIA Institute (pending additional funding)

Harlem River

Harlem River

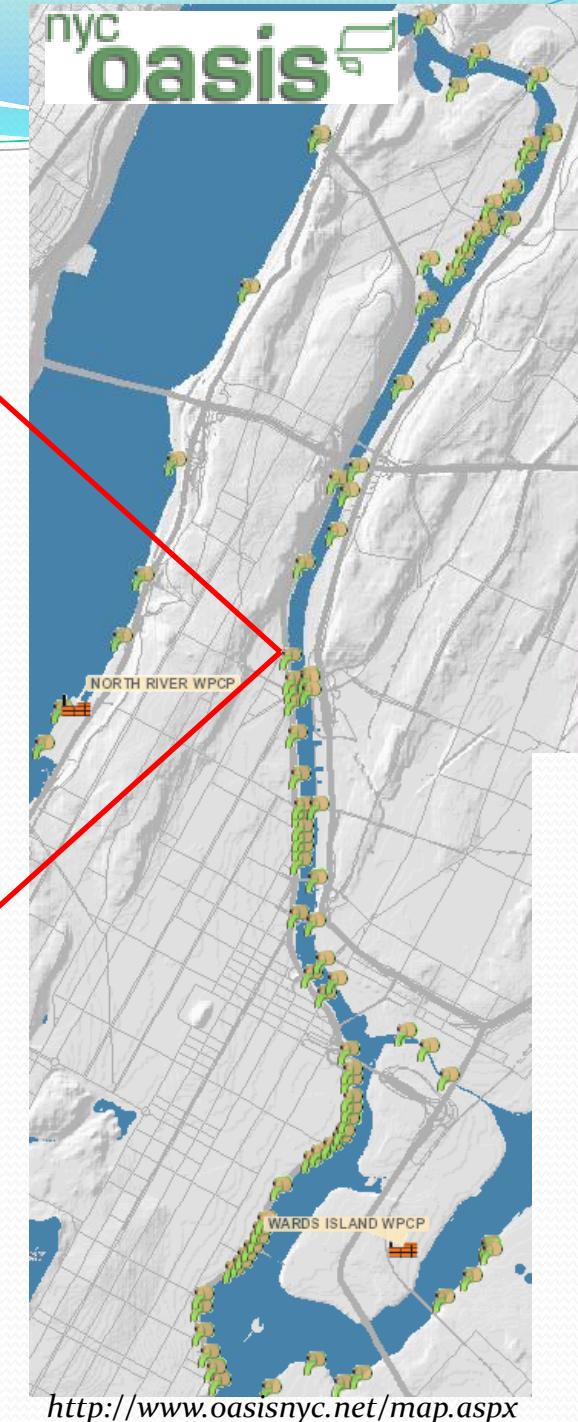
- 8-mile stretch converted to tidal strait during early urban development
- Limited accessibility to the Harlem River for community enjoyment
 - Under-utilized waterfront with few parks
 - Direct water access hindered by bulkheads and railway infrastructure
- Included in the NY/NJ Harbor Estuary and Hudson River Estuary Programs
- “Watershed” highly urbanized
 - Direct freshwater contributions limited to **runoff** and **Combined Sewer Overflow (CSO)**; limited GW influx
 - CSOs act as point-sources of pollutants
 - **Runoff** and **adjacent waterways** (Hudson River/East River) **activities** serve as nonpoint-sources of pollutants



Harlem River

Water-quality concerns

- CSO events
 - Precipitation
 - Increased water use
 - WWTP failure
- Untreated sewage contributes to a decrease in water quality and usability
 - Increased **Fecal Coliform** and **Enterococci** levels
 - Decreased **dissolved oxygen**
 - Increased **nutrient** loading
- Storm water runoff contributes to poor water quality
 - Increase in **pollutants** from roads and sidewalks
 - Litter washed down drains and into the river (**floatables**)
- On-going improvements have decreased the number of CSO events and better sustained-water quality



Harlem River

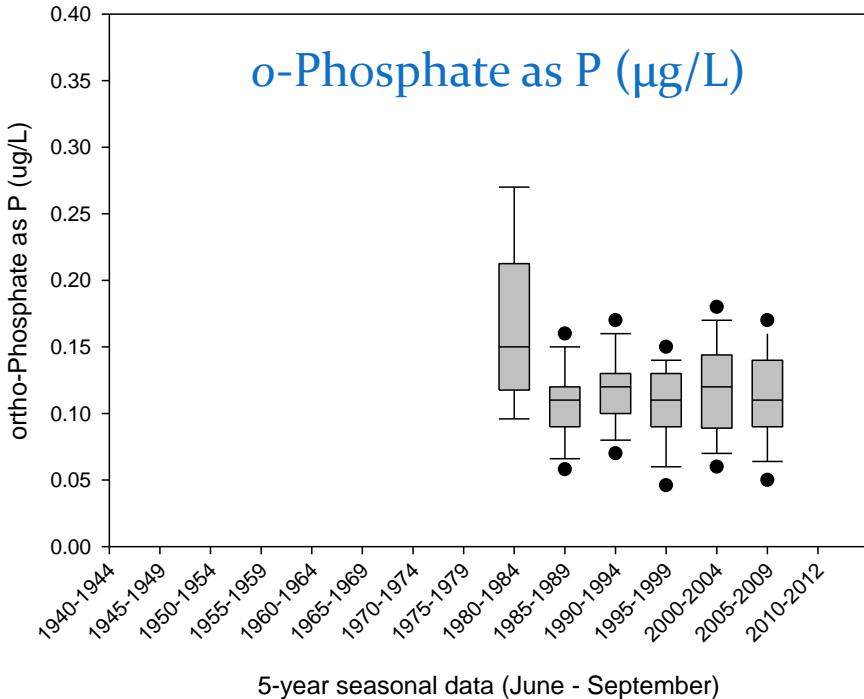
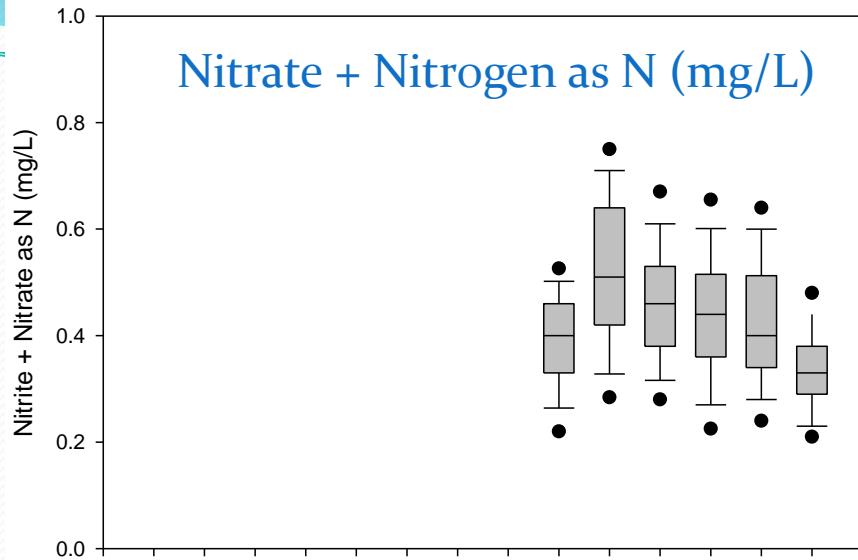
Water-quality data sources

- Data sources
 - NYC Environmental Protection
 - New York Harbor Survey Program – **over 100 years of water quality data**
 - Annual Reports
 - Riverkeeper, Inc.
 - Basic water-quality parameters and Enterococcus levels
 - Website
 - U.S. Environmental Protection Agency
 - Water- and sediment-quality data from 2000-2002
 - Storage and Retrieval (STORET) data repository
- Relate NWS precipitation records to NYC EP water quality data
 - Better assess the effects of CSO events relative to basic water quality parameters
 - Correlate these with fecal coliform and/or Enterococcus levels that limit contact with water, as well as fin- and shell-fishing
- Studies on water quality, net-flow, and floatables also available

Harlem River

Water-quality concerns

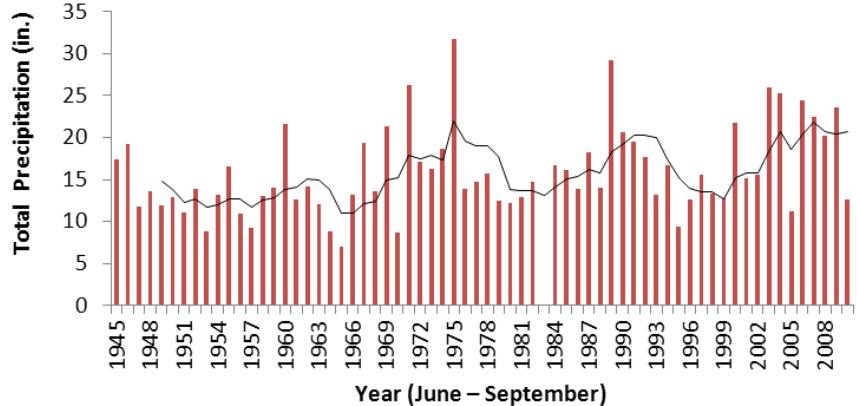
- Relating and interpreting data
- Parameters for determining eutrophication limited
- 2007 study by NOAA reports for Hudson River/Raritan Bay (which includes Harlem River) as **Moderately Eutrophic**



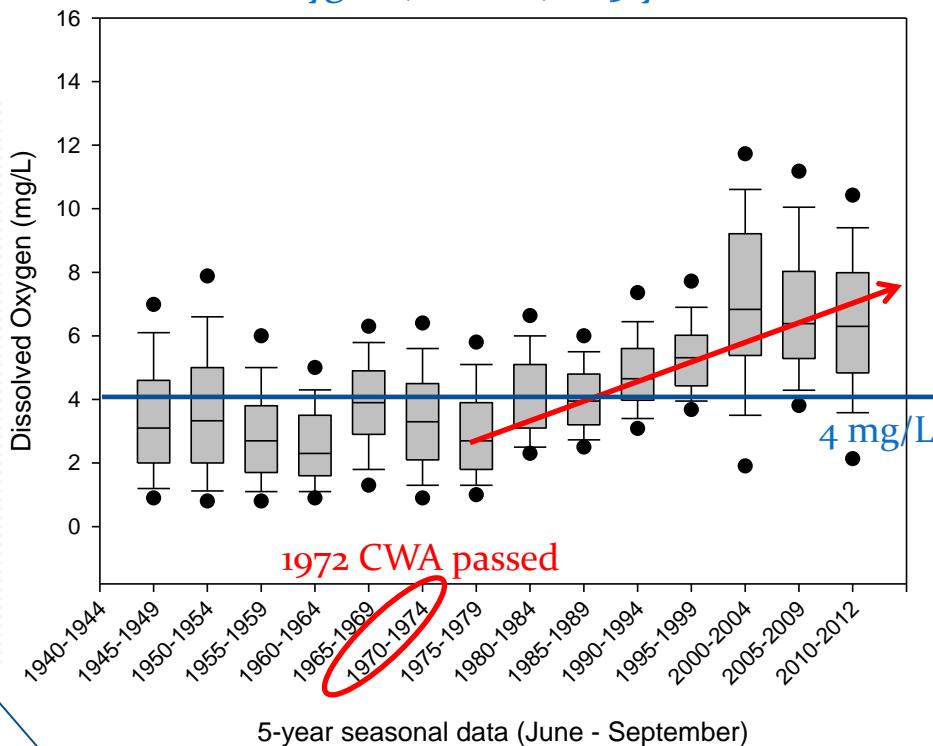
Harlem River – water quality

Dissolved Oxygen

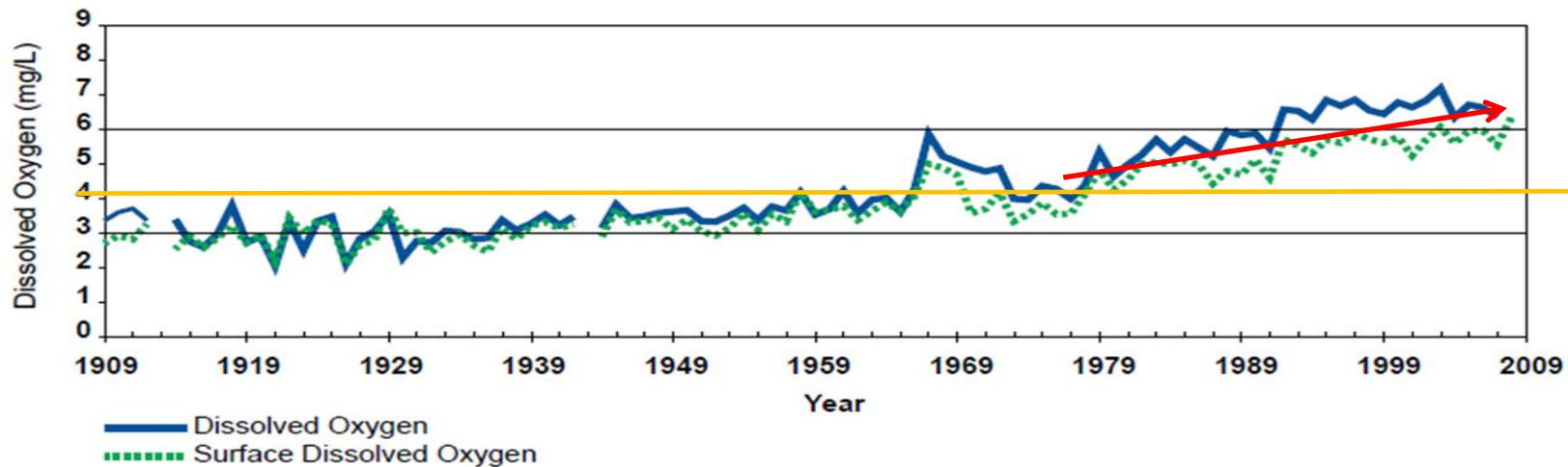
Seasonal Precipitation Totals (June – Sept)



Dissolved oxygen (Surface) in 5-year increments



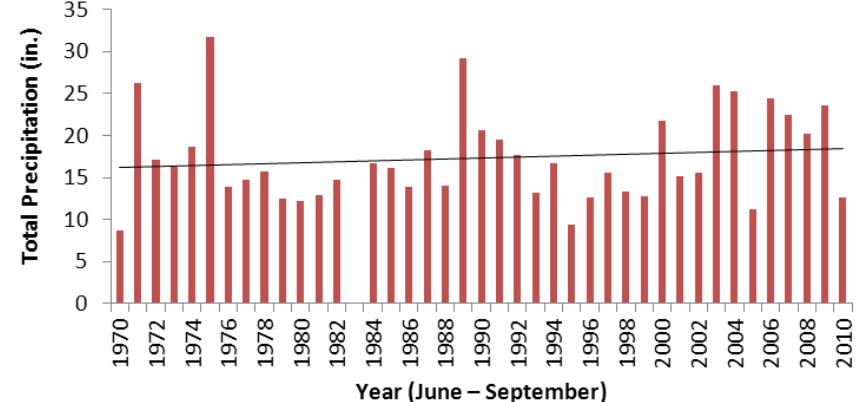
*Summer average dissolved oxygen from 1909 to 2009
Harbor-wide, seasonal geometric average*



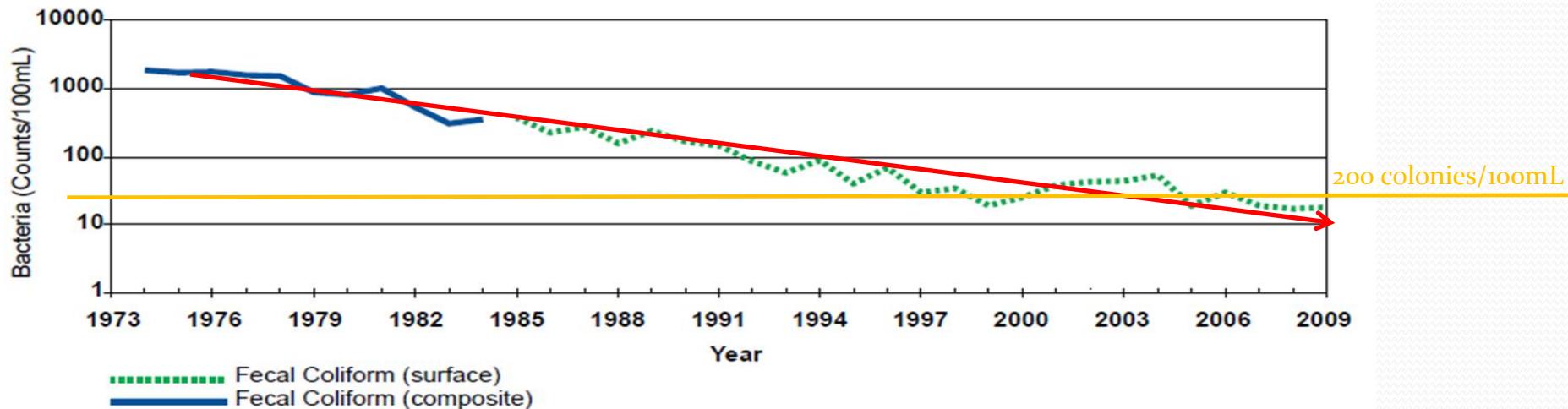
Harlem River – water quality

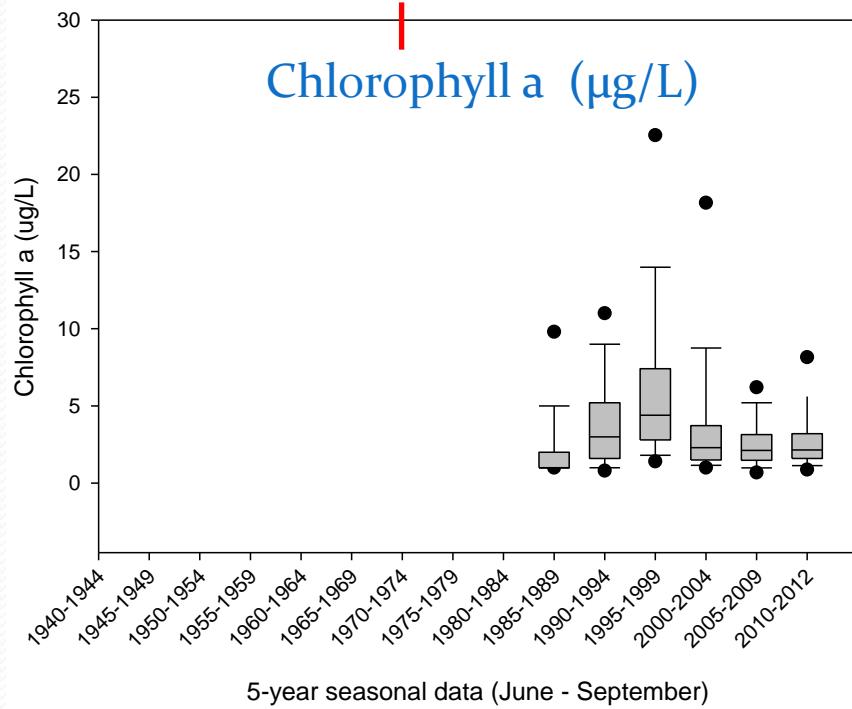
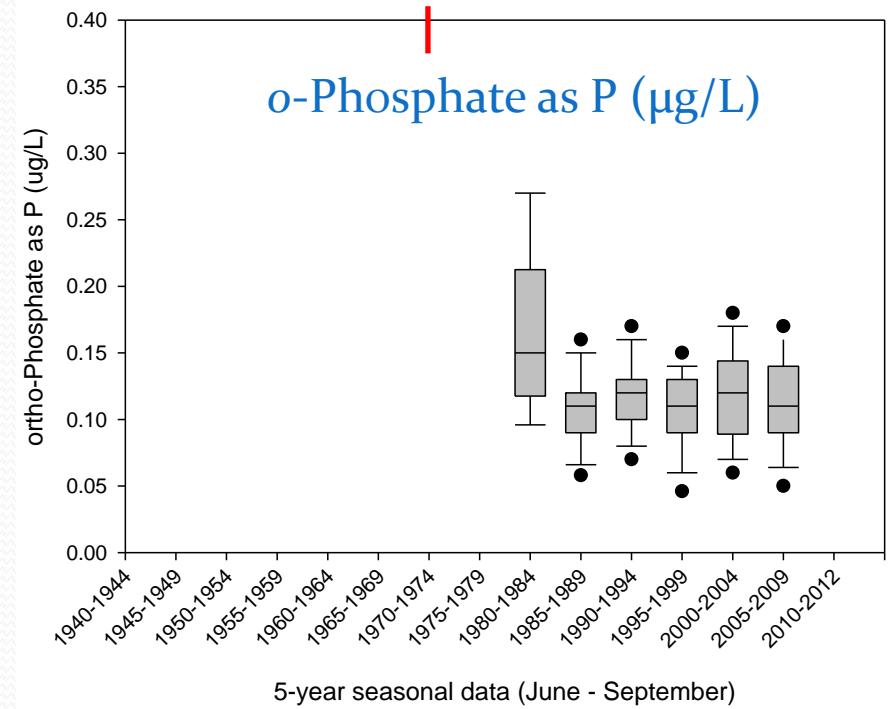
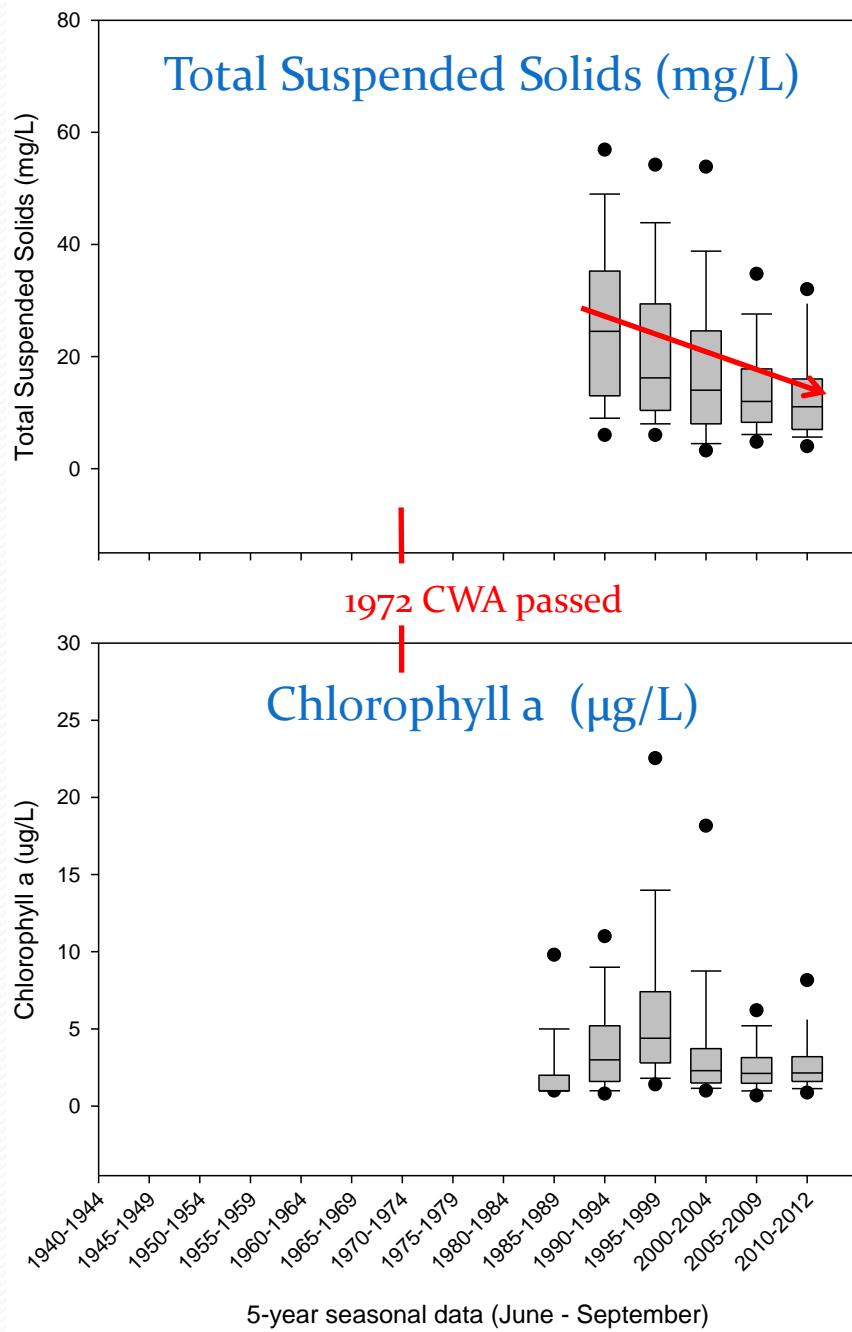
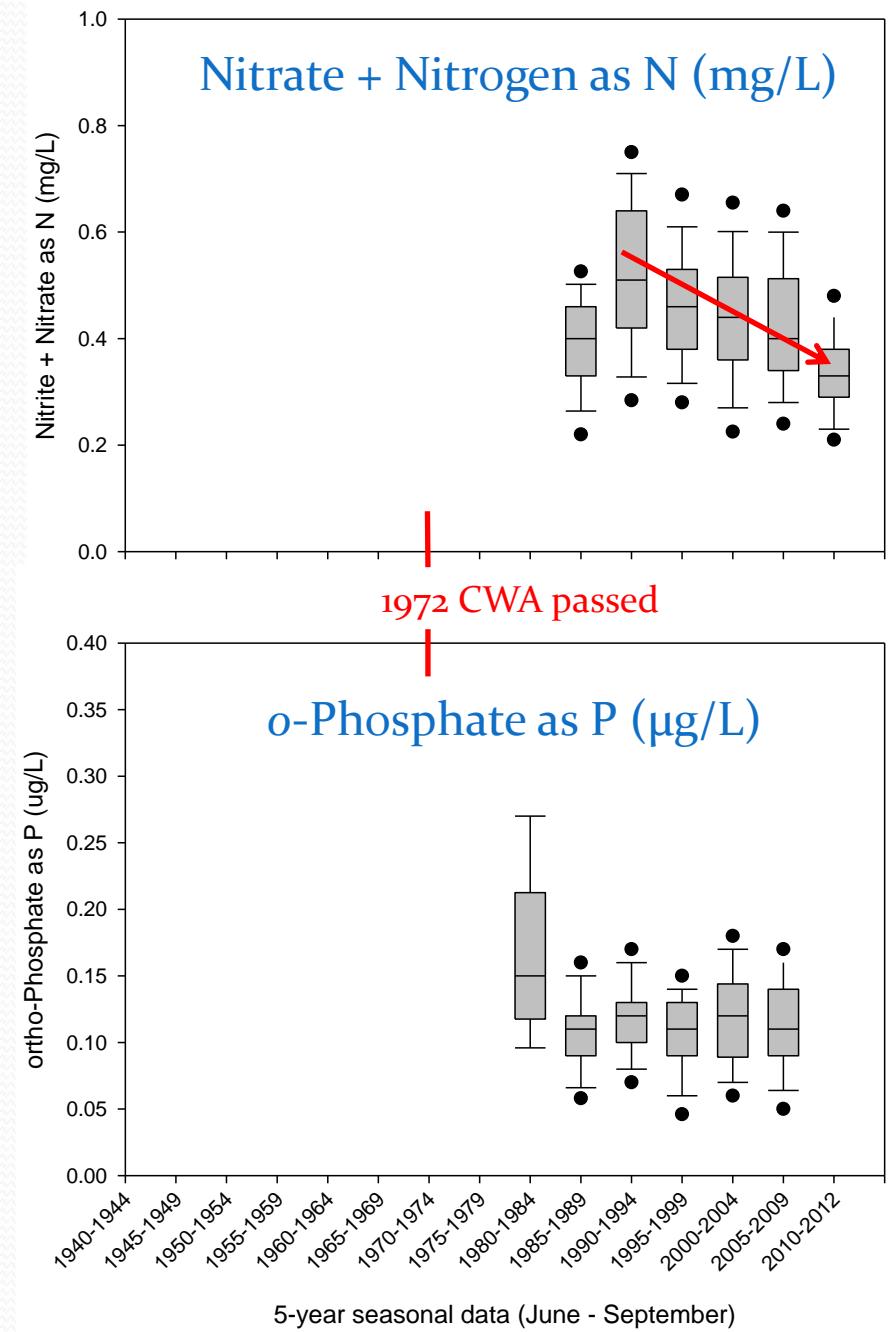
Fecal Coliform

Seasonal Precipitation Totals (June – Sept)



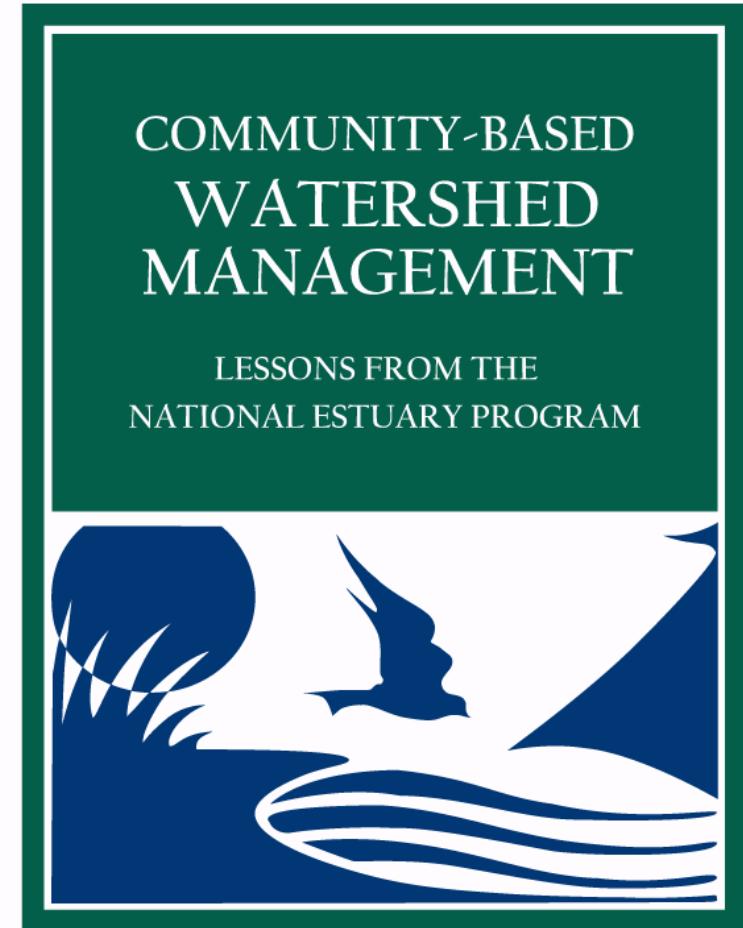
*Summer average Fecal Coliform from 1909 to 2009
Harbor-wide, seasonal geometric average*





Harlem River

- Need for a Total Maximum Daily Loads (TMDL)
 - Nitrogen
 - Pathogens
- Need continuous monitoring along the Harlem River (preferably at a location where weekly samples are collected)



Harlem River

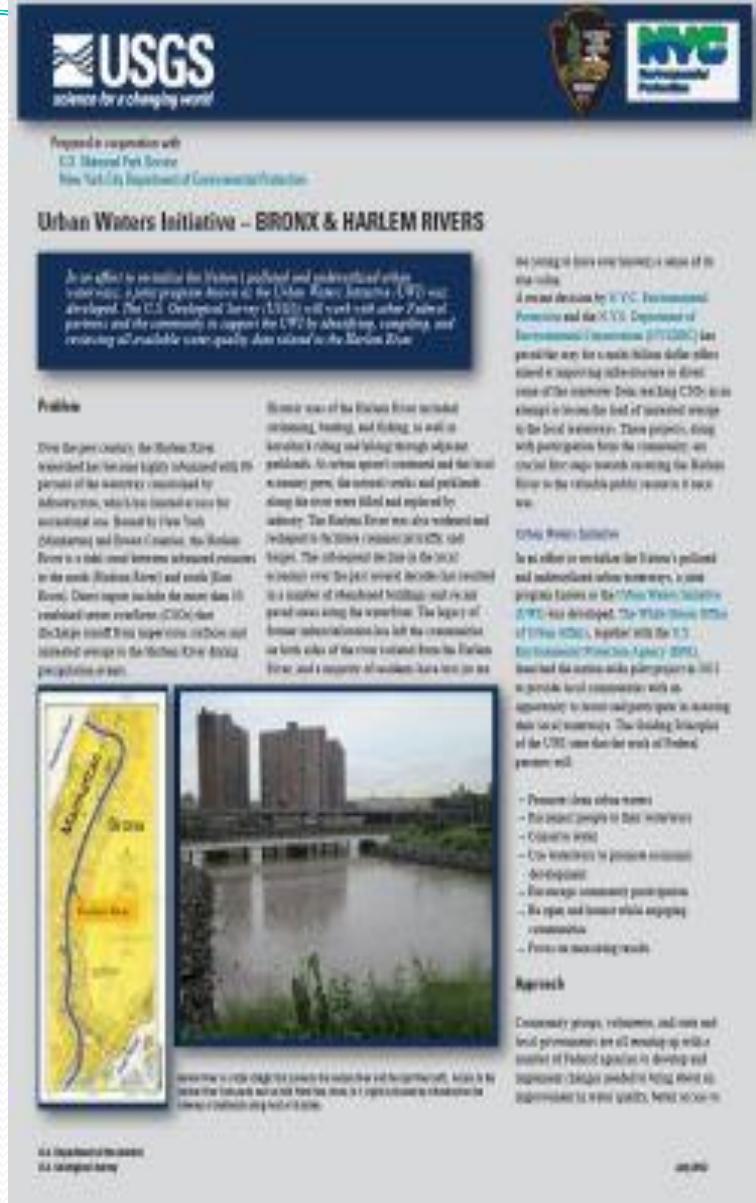
- Improvements to WWTP have improved the water quality significantly over the past 40 years
- Changing in NYS DEC classification from I to C or B would likely require diverting, retaining, preventing CSO input



From EPA's Urban Waters website

Harlem River

- Summary of current objectives and sources of information related to the Harlem River available on the **USGS UWI – Bronx & Harlem Rivers** webpage
- Information also available through the NYC EP website



The screenshot shows the homepage of the USGS Urban Waters Initiative for the Bronx & Harlem Rivers. The page features the USGS logo at the top left, followed by a banner with logos for C.D. Hooker Park Society and the New York City Department of Environmental Protection. The main title is "Urban Waters Initiative – BRONX & HARLEM RIVERS". Below the title is a box containing text about the initiative's goal to restore the river's physical and ecological health. The page is divided into several sections: "Problem", "Proposed Solutions", "Project Details", "Press Release", and "Contact Us". A map of the Bronx and Harlem Rivers is on the left, and a photograph of buildings along the river is on the right.

Proposed in cooperation with
C.D. Hooker Park Society
New York City Department of Environmental Protection

Urban Waters Initiative – BRONX & HARLEM RIVERS

An effort to restore the Bronx's polluted and underutilized urban waterways, which begins above c. the Bronx-Whitestone Dyke and downstream. The C.D. Hooker Park Society (CDHS) will work with other Federal partners and the community to support the UWI by advocating, competing, and restoring all available water quality data critical to the Bronx River.

Problem

Over 100 years of the Bronx River suffered from dredging, boating, and fishing, as well as industrializing and living through adjacent residential areas. All areas spent tremendous and often unnecessary time and resources to clean up their rivers filled and replaced by industry. The Bronx River was also rendered and relegated to the city's drainage system (the C.D.H. Canal Project). The infrastructure in place is the result of decades of poor planning and neglect. The legacy of industrialization and pollution has left the community on both sides of the river isolated from the Bronx River, and a majority of residents have little or no access to the river.

Proposed Solutions

In an effort to restore the Bronx's polluted and underutilized urban waterways, a core program focuses on the Bronx-Whitestone Dyke area developed. The Bronx-Whitestone Dyke is the Bronx-Whitestone Canal (BXWC), completed in 1913. It is located in Bronx, New York City. BXWC connects the Bronx River to the Bronx Kill, which flows into the Hudson River. BXWC has been identified as a priority for restoration due to its unique role in the Bronx River's ecosystem. BXWC is a major source of pollution in the Bronx River, and a majority of residents have little or no access to the river.

Project Details

- Protect water bodies
- Encourage people to their waterways
- Clean water
- Use waterways to promote economic development
- Encourage community participation
- Encourage and support tribal, existing communities
- Focus on monitoring results

Press Release

Community groups, volunteers, and more and local governments are all working together to restore the Bronx-Whitestone Dyke area. This is a great example of restoration and community engagement in action.

U.S. Department of the Interior
U.S. Geological Survey

Bronx River

Bronx River

- 20 miles long, with a total drainage area of 60 square miles
- Less impacted by CSO events, but still some upstream effects
- Floatables observed but not documented
- Part of USGS Basic Data network in cooperation with NYC EP
- Stream flow data collection since 1944, continuous, real-time monitoring since 2006
- Emergency managers use data to minimize loss of life and damage to infrastructure
- A “100-year flood” (4/15-16/2007) was recorded following over 8 inches of rain over two days
- Bronx Zoo kiosk
 - Presentation loop describes USGS streamgaging and the benefits of data collection
 - Will be displaying real-time data soon

Bronx River

- Segments of the Bronx River NYS DEC designation
 - Class I – secondary contact only; fishing
 - Class C – primary and secondary contact with stipulations; fishing
 - Class B – primary and secondary contact; fishing

ER-3 portion	Mouth to East Tremont Avenue bridge.	R-24se R-24sw	I	I
ER-3 portion	From East Tremont Avenue bridge to Bronx-Westchester county line.	R-24sw R-24se R-24ne	B	B
ER-3 portion	From Bronx-Westchester county line to trib. 33.	R-24se Q-24se	C	C
ER-3 portion	From trib. 33 to trib. 38.	Q-24se	C	C(T)
ER-3 portion	From trib. 38 to Kensico Dam.	Q-24se	C	C

Class C

Class B

Class I

USGS
Gaging
Station

Bronx River

Real-time Discharge and Water Level



Normal conditions
(base flow)

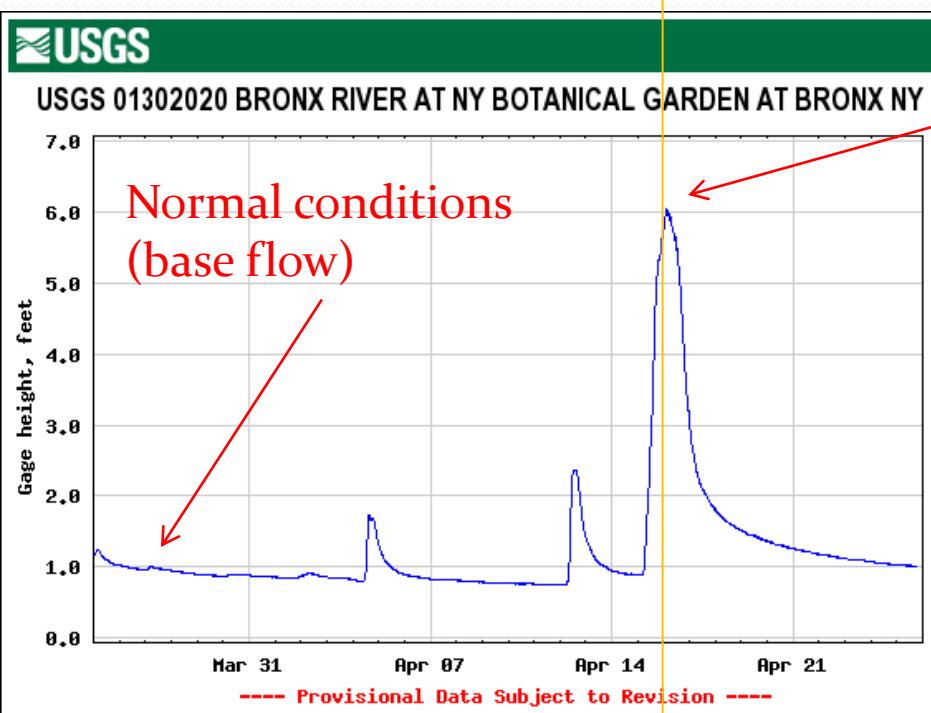


Flooding conditions
(~8" of rain in two days)

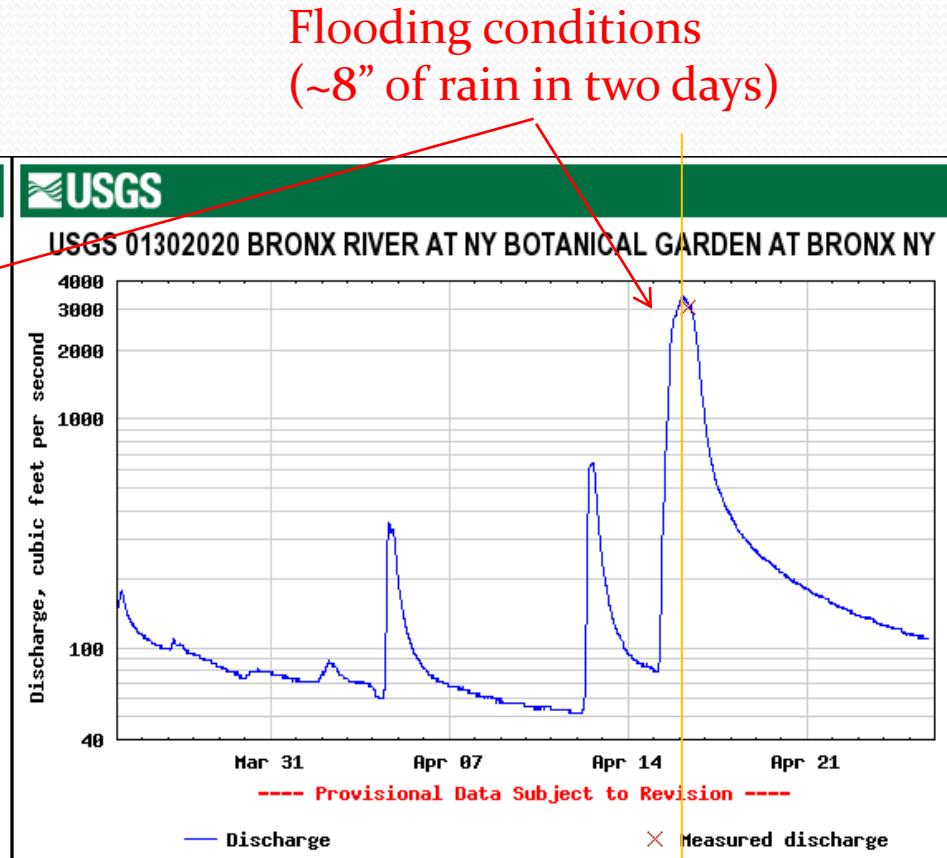
Bronx River

Real-time Discharge and Water Level

April 16, 2007



Stream stage (feet)



Flow (cubic feet per second)

Bronx River



Old Snuff Mill on the Bronx River (flooding conditions)

Bronx River



04/16/2007

Bronx River in the Botanical Gardens (flooding conditions)

03/27/2006

Thank you!

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<http://ny.cf.er.usgs.gov/nyprojectsearch/projects/LKoo-DU700.html>